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Phenolic profile, antioxidant capacity, and *in vivo* sub-acute toxicity evaluation of *Calligonum comosum* L. aerial part

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Abstract. This study provides a comprehensive analysis of the phenolic constituents and antioxidant properties of *C. comosum*, complemented by an evaluation of its acute toxicity in vivo. Employing spectrophotometric techniques, we quantified the total polyphenol content (TPC) and total flavonoid content (TFC) using gallic acid and quercetin standards, respectively. High-performance liquid chromatography (HPLC) was utilized to identify and quantify individual phenolic compounds. Antioxidant efficacy was measured through assays assessing total antioxidant capacity, 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging, and reducing power (RP). The analysis revealed a substantial polyphenol content of 185.073 mg GAE/g DW and a flavonoid content of 21.75 mg QE/g DW. HPLC detected eight distinct phenolic compounds, with quercetin and rutin emerging as the most predominant. The aqueous extract of *C. comosum* exhibited pronounced antioxidant activity, with significant inhibition across the tested assays. Acute toxicity studies on Wistar rats indicated a favorable safety profile, showing no mortality or significant behavioral changes at doses up to 2000 mg/kg. In conclusion, *C. comosum* demonstrates a rich reservoir of secondary metabolites with substantial antioxidant potential, affirming its potential as a candidate for therapeutic applications. However, additional in vivo studies are essential to fully elucidate its therapeutic efficacy and safety profile.

***Keywords*:** *Calligonum comosum* L; HPLC analysis; anti-oxidant capacity; sub-acute toxicity.

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